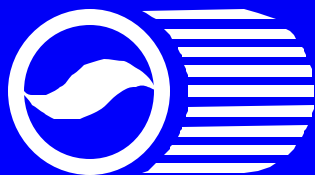


Children's Air Pollution Health Studies

Barbara L. Weller, Ph.D.

California Air Resources Board



California Environmental Protection Agency

Air Resources Board

Our Focus is On Children

- Why are these studies needed?
- What are we doing?
- What do we need to do?



Children and Air Pollution

- Children are sensitive to air pollution
- Little is known about air pollution effects on children
- Long-term studies are needed to determine chronic effects



Childhood Asthma

- A complex issue
- On the rise
- Air pollution
 - May play a role in new cases
 - Worsens existing asthma
- A focus of ARB research efforts



Air Pollution, Children's Development, and Asthma Research

- **Southern California Children's Health Study**
- **Fresno Asthmatic Children's Environment Study (FACES)**

Southern California Children's Health Study

- **10+ year study of air pollution impact on lung health and growth**
- **Over 5,500 children studied**
 - **12 communities with different pollution profiles**
 - **increased community monitoring**
 - **lung function testing and questionnaires**



Previous Results

- O_3 increases school absences
- PM10 increases bronchitis in asthmatics
- PM10, NO_2 , acids reduce lung function growth

Asthma in Exercising Children Exposed to Ozone: a Cohort Study

- **3535 children recruited from schools**
- **Baseline questionnaire:**
 - previous asthma diagnosis
 - number of team sports
- **Pollutants measured 1994-1997**

Lancet 2002; 359: 386-91

Results

Relative Asthma Risks

Pollutant

Plays 3 or More
Team Sports

Plays No
Team Sports

High ozone communities

3.3 X increased risk

no increased risk

Low ozone communities

no effect of sports

Nitrogen dioxide, PM10,
acid vapor

no effect of sports

Respiratory Effects of Relocating to Areas of Differing Air Pollution Levels

- **Moved to 6 western states**
- **Assigned annual pollution scores:**
 - 24-h NO_2
 - daily average PM_{10} mass
 - 10am-6pm O_3
- **Pollution score=**
1998 average - 1994 average

Results

- PM10 statistically significant
- - PM10 exposure associated with -
in lung function growth rate
- Community of origin important
 - High or low 1994 community
- Time since moved important
 - 3-5 years versus 1-2 years

Implications

- Increased risk of asthma in children playing 3 or more sports in high ozone
- Importance of ozone advisories and ozone reduction
- Lung function growth altered by air pollution

The Future of CHS

- ARB and USC determining analysis plan
- USC seeking support from NIH to follow children

Fresno Asthmatic Children's Environment Study

- 300 asthmatic children
- Study of the effect of environmental factors including air pollution, on daily asthma symptoms and long term asthma progression.



Increased Air Pollution Monitoring in Homes and Schools

- **Criteria Pollutants**
- **Mold, endotoxin, pollens**
- **Environmental tobacco smoke**
- **Components of particulate matter**
- **Volatile organic compounds**



Health Measurements

- Lung function testing
- skin testing for allergens
- questionnaires on home environment
- daily dairies

Vulnerable Populations Research Program

- **Sensitive sub-populations**
- **Quantify their health effects**
- **Identify exposure to air pollution**

Thank you

